CLAIMS

What is claimed is:

1. A system for determining an intracorporal position of a working catheter, comprising

a working catheter for carrying out desired working operations, and

an intracorporal reference catheter for producing a co-ordinate system,

wherein the working catheter has a plurality of working catheter reference units for sending signals which are characteristic for the position of the working catheter, and

the reference catheter has a plurality of reference catheter reference units for receiving the signals sent by the working catheter reference units, and

a processing unit for calculating the position and an intracorporal orientation of the working catheter on the basis of signals received from the reference catheter reference units.

2. The system as set forth in claim 1

wherein the working catheter is a mapping catheter for generating a three-dimensional image of the heart cavity surrounding the mapping catheter.

3. The system of claim 1,

wherein the working catheter is an ablation catheter for producing a lesion of the endocardium surrounding the ablation catheter.

4. The system of claim 1,

wherein the working catheter is a catheter which can be fixedly implanted in a body and which carries electrodes of a cardiac pacemaker or a defibrillator.

5. The system of claim 1,

wherein the working catheter reference units are asymmetrically arranged on the working catheter so that the orientation of the working catheter can be detected in the co-ordinate system of the reference catheter.

6. The system of claim 1,

wherein the reference units are coils or ultrasonic crystals mounted on or in the catheter.

7. The system of claim 1,

wherein at least one reference unit is arranged at the catheter tip and

at least one further reference unit is arranged in the rest of the distal region of the catheter.

8. The system of claim 1,

wherein the distal region of the working catheter is of a previously established specific shape on which distal region at least three reference units are distributed so that the specific, previously established shape of the distal region can be incorporated by the processing unit when ascertaining the position of the working catheter by calculating the position of the working catheter.

9. The system of claim 1,

wherein either the reference catheter is also a working catheter or the working catheter is also a reference catheter, such that reference units for transmitting waves and reference units for receiving waves are provided on each catheter.

10. The system of claim 1,

wherein the processing unit is adapted by means of the reference units to implement topological and/or electrical measurement of the endocardium in which the respective working catheter is disposed.

11. The system of claim 1,

wherein the reference catheter reference units irradiate electromagnetic radiation and/or ultrasonic waves to ascertain the position of the working catheter in the co-ordinate system afforded by the reference catheter, wherein the reference catheter reference units build up at least one electromagnetic field.

12. The system of claim 1,

wherein the reference catheter is placed in the coronary sinus for use of the system in the heart.

13. The system of claim1,

wherein the processing unit calculates a three-dimensional spline that represents the position of the working catheter in the reference catheter co-ordinate system from the data from the at least three working catheter reference units.

14. The system of claim1,

wherein the processing unit is integrated in the respective catheters.

15. The system of claim1,

wherein at least one of the reference units is a sensor for detecting the presence and/or the strength of the wall contact of the working catheter with the endocardium surrounding the catheter.

16. The system of claim 1,

wherein the system has between two and five working catheters, wherein each catheter has between three and twenty-four reference units which are electrodes to detect the corresponding number of potential differences in the case of working catheters inserted into a cavity in a heart.

17. The system of claim 16,

wherein the electrodes are ring electrodes.

18. The system of claim 1,

wherein the reference units are electrodes that are actuatable simultaneously by the processing unit.

19. The system of claim 1,

wherein the working catheter has at least two electrodes mounted on the working catheter at different locations from the reference units, wherein , relative to the electrodes , the reference units are in a previously established specific

spatial position that can be taken into account by the processing units when ascertaining the position of the working catheter in the co-ordinate system defined by the reference catheter.

20. The system of claim 1, comprising

control members at the proximal end of the working catheter for producing a rotation of the working catheter and/or a flexing of the distal end of the working catheter.

21. The system of claim 20, comprising

a first signal line, extending from the distal tip to the proximal end of the working catheter and connecting to the working catheter reference units, and

a second signal line, extending from the distal tip to the proximal end of the reference catheter and connecting to the reference catheter reference units,

wherein the processing unit is connected by way of the first signal line to the working catheter reference units and by way of the second signal line to the reference catheter reference units, and

wherein the processing unit is connected to the control members actuates the control members in response to the signals from the reference catheter reference units in order to produce a rotation or a flexing of the working catheter.

22. A working catheter having a distal tip and a proximal end for use in a system as set forth in claim 1

characterised by

reference units for sending signals which are characteristic for the position of the working catheter, and

a signal line which extends from the distal tip to the proximal end of the working catheter and which is connected to the reference units.

23. A reference catheter having a distal tip and a proximal end for use in a system as set forth in claim 1

characterised by

reference units for receiving position signals, and

a signal line which extends from the distal tip to the proximal end of the reference catheter and which is connected to the reference units.

24. The system of claim 3,
wherein the ablation catheter produces a linear lesion.

25. The system of claim 2,
wherein the working catheter is a catheter which can be fixedly implanted in a body and which carries electrodes of a cardiac pacemaker or a defibrillator.

26. The system of claim 3,
wherein the working catheter is a catheter which can be fixedly implanted in a body and which carries electrodes of a cardiac pacemaker or a defibrillator.

27. The system of claim 4,
wherein the working catheter reference units are asymmetrically arranged on the working catheter so that the orientation of the working catheter can be detected in the co-ordinate system of the reference catheter.

28. The system of claim 25,
wherein the working catheter reference units are asymmetrically arranged on the working catheter so that the orientation of the working catheter can be detected in the co-ordinate system of the reference catheter.

29. The system of claim 26,
wherein the working catheter reference units are asymmetrically arranged on the working catheter so that the orientation of the working catheter can be detected in the co-ordinate system of the reference catheter.

30. The system of claim 5,
wherein the working catheter reference units are arranged to form the corners of a triangle.

31. The system of claim 27,

wherein the working catheter reference units are arranged to form the corners of a triangle.

32. The system of claim 28,

wherein the working catheter reference units are arranged to form the corners of a triangle.

33. The system of claim 29,

wherein the working catheter reference units are arranged to form the corners of a triangle.

34. The system of claim 5,

wherein the reference units are coils or ultrasonic crystals mounted on or in the catheter.

35. The system of claim 27,

wherein the reference units are coils or ultrasonic crystals mounted on or in the catheter.

36. The system of claim 28,

wherein the reference units are coils or ultrasonic crystals mounted on or in the catheter.

37. The system of claim 29,

wherein the reference units are coils or ultrasonic crystals mounted on or in the catheter.

38. The system of claim 6,

wherein at least one reference unit is arranged at the catheter tip and

at least one further reference unit is arranged in the rest of the distal region of the catheter.

39. The system of claim 34,

wherein at least one reference unit is arranged at the catheter tip and

at least one further reference unit is arranged in the rest of the distal region of the catheter.

40. The system of claim 35,
wherein at least one reference unit is arranged at the catheter tip and
at least one further reference unit is arranged in the rest of the distal region of the catheter.

41. The system of claim 36,
wherein at least one reference unit is arranged at the catheter tip and
at least one further reference unit is arranged in the rest of the distal region of the catheter.

42. The system of claim 37,
wherein at least one reference unit is arranged at the catheter tip and
at least one further reference unit is arranged in the rest of the distal region of the catheter.

43. The system of claim 7,
wherein the at least one further reference unit is a plurality of said reference units.

44. The system of claim 43,
wherein there are at least twelve said further reference units arranged in the rest of the distal region of the catheter.

45. The system of claim 43,
wherein there are fewer than twenty-four further reference units arranged in the rest of the distal region of the catheter.

46. The system of claim 8,
wherein the previously established specific shape is a circular arc.

47. The system of claim 9,

wherein either the reference catheter is also a working catheter or the working catheter is also a reference catheter , such that reference units for simultaneously transmitting waves and receiving waves are provided on each catheter.

48. The system of claim 9,

wherein the waves transmitted or received by the reference units are electromagnetic.

49. The system of claim 47,

wherein the waves transmitted or received by the reference units are electromagnetic.

50. The system of claim 9,

wherein the waves transmitted or received by the reference units are ultrasonic.

51. The system of claim 47,

wherein the waves transmitted or received by the reference units are ultrasonic.